

**COTTON AND PALMER AMARANTH RESPONSE TO MILO-PRO APPLIED AT-PLANT AND POST**

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**Abstract**

Palmer amaranth is a large, competitive, C4 annual that can form dense populations in infested fields, thereby reducing yields and harvest efficiency. Palmer amaranth biotypes with resistance to glyphosate or pyriithobac are widespread in GA. Resistance to one or both modes of action severely limit postemergence (POST) control options for Palmer amaranth in cotton. Glufosinate can control Palmer amaranth effectively, in glufosinate-tolerant cotton, but only if herbicide applications are made to weed seedlings <4 inches in height. The next wave of POST herbicide technology, 2,4-D-resistant cotton and dicamba-resistant cotton, will not be available to growers before 2014. Therefore, residual herbicide use is critical for managing Palmer amaranth populations in an agronomic setting. The objective of this study was to evaluate Palmer amaranth control and cotton tolerance to Milo-Pro (propazine), a preemergence (PRE) triazine herbicide previously labeled for use in grain sorghum.

Field studies were conducted in Macon County and Moultrie, GA, and Rocky Mount, NC, on sandy-loam soils. Twelve herbicide treatment programs were applied at both sites in GA and included:

1. Propazine at 1 pt/A PRE fb glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
2. Propazine at 2 pt/A PRE fb glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
3. Fluometuron at 1 pt/A PRE fb glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
4. No herbicide PRE fb glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
5. No herbicide PRE fb propazine at 1 pt/A + glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
6. No herbicide PRE fb propazine at 2 pt/A + glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
7. No herbicide PRE fb metolachlor at 1.3 pt/A + glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
8. No herbicide PRE fb pyriithobac at 2.5 oz/A + glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
9. Fomesafen at 1 pt/A PRE fb glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
10. Fomesafen at 1 pt/A PRE fb propazine at 2 pt/A + glyphosate at 22 oz/A POST (2-3 leaf cotton) fb glyphosate POST (6-8 leaf cotton).
11. Fomesafen at 1 pt/A PRE fb propazine at 1 pt/A + glyphosate at 22 oz/A POST (2-3 leaf cotton) fb propazine at 1 pt/A + glyphosate POST (6-8 leaf cotton).
12. Non-treated check

The fomesafen-based treatments were not included in the NC studies. The studies were planted to Roundup Ready Flex cotton and all POST herbicides were applied topically. All plots received glyphosate POST-directed at layby, except for the fomesafen-based treatments in GA, which received diuron + MSMA. Crop injury data was taken from all sites throughout the growing season; glyphosate-resistant Palmer amaranth control was evaluated at the Macon County site, only.

In GA, fomesafen was the only PRE herbicide to injure cotton (11%) 1 week after PRE (WA-PRE) herbicides were applied; by 3 WA-PRE, injury due to fomesafen was 5%. Cotton injury at 1 week after POST (WA-POST) herbicide applications was 3% when propazine was applied POST at 2 pt/A with glyphosate, although this injury was transient and cotton had recovered within 3 weeks. Cotton injury in response to metolachlor and pyriithiobac applied POST with glyphosate was 5% and 10%, respectively, at 1 WA-POST; however, cotton was completely recovered by 3 WA-POST. Glyphosate and propazine at 1 pt/A did not injure cotton. Similar results were reported from Rocky Mount; mean propazine injury on cotton did not exceed 6-8% when applied either PRE or POST.

Propazine (at both rates), fluometuron and fomesafen applied PRE provided 98-99% control of glyphosate-resistant Palmer amaranth 1 WA-PRE. At 3 WA-PRE, fluometuron and propazine at 1 pt/A provided 82% and 85% control, respectively. Propazine at 2 pt/A (96%) was similarly effective as fomesafen (99%) at controlling Palmer amaranth 3 WA-PRE. Glyphosate, metolachlor and propazine at 1 pt/A applied POST were completely ineffective at controlling emerged glyphosate-resistant Palmer amaranth in the absence of PRE herbicides. When PRE herbicides were excluded from the system, propazine at 2 pt/A and pyriithiobac provided 60% and 95% control of glyphosate-resistant Palmer amaranth, respectively, 1 WA-POST. By 3 WA-POST, Palmer amaranth control was 47% for propazine and 77% for pyriithiobac.

Propazine was most effective at controlling glyphosate-resistant Palmer amaranth when included as a POST applied herbicide following PRE applications of fomesafen. Glyphosate-resistant Palmer amaranth control 1 WA-POST herbicide applications to 6-8 leaf cotton was 97% when propazine was applied at 1 pt/A in sequential applications (2-3 leaf and 6-8 leaf cotton) and when propazine was applied at 2 pt/A to 2-3 leaf cotton, only. At harvest, propazine applied at 1 pt/A in sequential applications and propazine applied at 2 pt/A in a single application provided 86% and 78% control of glyphosate-resistant Palmer amaranth, respectively; resultant yields were 1359 lb/A and 1192 lb/A seed cotton. The only other treatment that could be taken to harvest was fomesafen PRE fb glyphosate POST fb glyphosate POST, which yielded 732 lb/A seed cotton.

Results suggest that propazine could be included as a component of a weed control system in cotton to provide residual and some topical control of Palmer amaranth, although its use would be dependent on site characteristics. In related studies conducted in Clayton, NC and Attapulgus, GA, propazine applied PRE to extremely sandy soils at 3 and 4 pt/A severely injured cotton and significantly reduced cotton yields as much as 32%. The sorghum label for propazine indicates that it is not recommended for use on sand or loamy-sand soils and should not be applied at rates >2.4 pts/A.